IV. State of the Sound's SPECIES

The living resources of Puget Sound are the ultimate indicators of its health, and the picture they paint is very troubling. The Sound's diverse web of life is at risk. The building blocks of a healthy environment—clean water, abundant habitat, and an intact food web—are eroding. The effects of this erosion are being seen in declines in eelgrass, forage fish, salmon, rockfish, marine birds, and orcas. These losses may become self-reinforcing, as declines in eelgrass and forage fish can trigger a domino effect that results in the collapse of many other populations of species throughout the Sound.

INDICATOR: Species at Risk

U.S. Fish & Wildlife Service and NOAA Fisheries protect species through the federal Endangered Species Act (ESA). In Washington State, the Washington Fish and Wildlife Commission designates species for special attention under state authorities. Each agency then creates and carries out recovery plans for species they designate as threatened or endangered.

Status

As of June 2004, 40 animals in Puget Sound were on the federal and Washington State lists of threatened, endangered, or candidate species that need special protection.

- 31 of the 40 animal species are candidates for federal or state protection.
- Seven animal species are listed by the federal government as endangered or threatened.
- Six animal species are listed as endangered or threatened by the state of Washington.

Trend

Action Team staff have not developed trend information for this indicator because of the concern that the number of species on the various federal and state lists change as a result of administrative action as much as through changes in the condition of species. The other indicators in this chapter present trend information for specific animals.

INDICATOR: Rockfish

Rockfish include many species of long-lived, slow-growing marine fish that tend not to stray from their homes in the rocky reefs of Puget Sound. Some species live for 100 years. Many do not reach sexual maturity until they are five to seven years old or older.

The condition of a rockfish stock is measured by its potential to produce offspring, or its spawning potential. Spawning potential declines when there are fewer fish of spawning age or when individual fish produce fewer eggs. Older rockfish have much higher spawning potential because they produce many more offspring than younger fish and their offspring are more likely to survive.

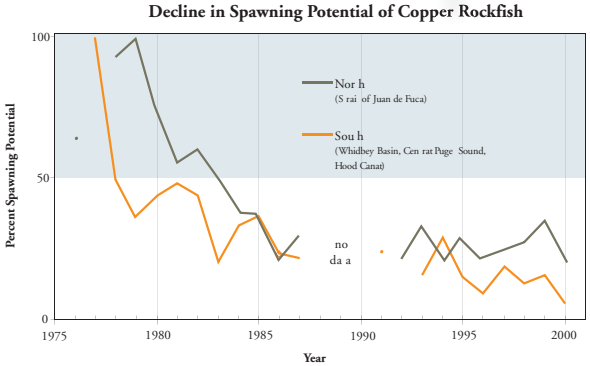
Depleted stocks take a long time to recover because of late sexual maturity and relatively low birth rates of younger and smaller fish. Long-lived species with low birth rates tend to be more vulnerable to loss and for that reason are sensitive indicators of human caused damage.

Status

Spawning potential of some rockfish populations in Puget Sound have fallen to 10 percent or less of their historical levels. Thirteen species of rockfish are candidates for listing under the state's endangered species act.

Trend

Rockfish stocks throughout Puget Sound have shown drastic declines in the past 25 years either because of fewer fish or smaller size of individual fish. In 2000, spawning potential of copper rockfish in northern Puget Sound was 12 percent of the level recorded in 1978 (an 88 percent decline) and the level in southern Puget Sound was only 7 percent of the 1978 level (a 93 percent decline). No new data are available since 2000 to provide information about the recent directions in these trends.



Rockfish Spawning Potential
The condition of a rockfish stock is measured by its potential to produce offspring, or its spawning potential. Spawning potential declines when there are fewer fish of spawning age or when individual fish produce fewer eggs. The spawning potential of copper rockfish has declined dramatically since 1975. Source: WDFW

Animal Species at Risk in Puget Sound*

Group	Common Name	State Status	Federal Status
Marine Mammals	Northern Pacific Humpback Whale	E	E
	Steller Sea Lion	T	T
	Orcas[8]	E	C
	Pacific Harbor Porpoise	C	
	Northern Sea Otter	E	
Birds	Bald Eagle	T	T
	Canada Goose, Aleutian	C	
	Golden Eagle	C	
	Marbled Murrelet	T	T
	Tufted Puffin	C	
	Brandt's Cormorant	C	
	Cassin's Auklet	C	
	Common Murre	C	
	Western Grebe	C	
Marine and Anadromous Fishes[9]	Chinook Salmon (Puget Sound)	C	T
	Chum Salmon (Hood Canal/E. Strait of Juan de Fuca)	C	T
	Coho Salmon (Puget Sound/Strait of Georgia)		C
	Bull Trout	C	T
	Pacific Hake	C	C
	Pacific Cod	C	
	Walleye Pollock	C	
	Pacific Herring (Cherry Point/Discovery Bay)	C	C
	Brown Rockfish	C	
	Copper Rockfish	C	
	Greenstriped Rockfish	C	
	Widow Rockfish	C	
	Yellowtail Rockfish	C	
	Quillback Rockfish	C	
	Black Rockfish	C	
	China Rockfish	C	
	Tiger Rockfish	C	
	Bocaccio Rockfish	C	
	Canary Rockfish	C	
	Redstripe Rockfish	C	
	Yelloweye Rockfish	C	
	Eulachon	C	
	River Lamprey	C	
Invertebrates	Olympia Oyster	C	
	Newcomb's Littorine Snail	C	
	Pinto (Northern) Abalone	C	

Species at Risk in Puget Sound
Listing Key:
E = Endangered
T = Threatened
C = Federal Species of Concern or Washington State Candidate

Federal Definitions of ESA Terms
Endangered: Any species in danger of extinction throughout all or a significant portion of its range.

Threatened: Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Species of Concern or Candidate Species: Any species being considered for listing as threatened or endangered.

* *federal and state listing status as of June 2004*

INDICATOR: Salmon

Salmon have long sustained the Salish and maritime cultures that form the roots of the unique Northwest identity. For millennia, the rivers and sea teemed with fish each year—dependable, superabundant, and seemingly unlimited. The loss of this once-abundant natural bounty is a potent sign that the Sound's ecosystem is in jeopardy.

Salmon are born in freshwater and migrate to saltwater. Many enter the ocean for some part of their lives and must return to freshwater to spawn. Salmon rely on Puget Sound's nearshore and marine environments for food, refuge, and migratory corridors on their journey to and from the ocean. The range of salinities in the Sound helps them undergo the vulnerable transition from fresh to saltwater.

Status

As shown in the table on page 42, populations of chinook salmon, Hood Canal summer chum, and bull trout are listed as threatened under the ESA. Coho salmon in this region are federally designated as a species of concern.

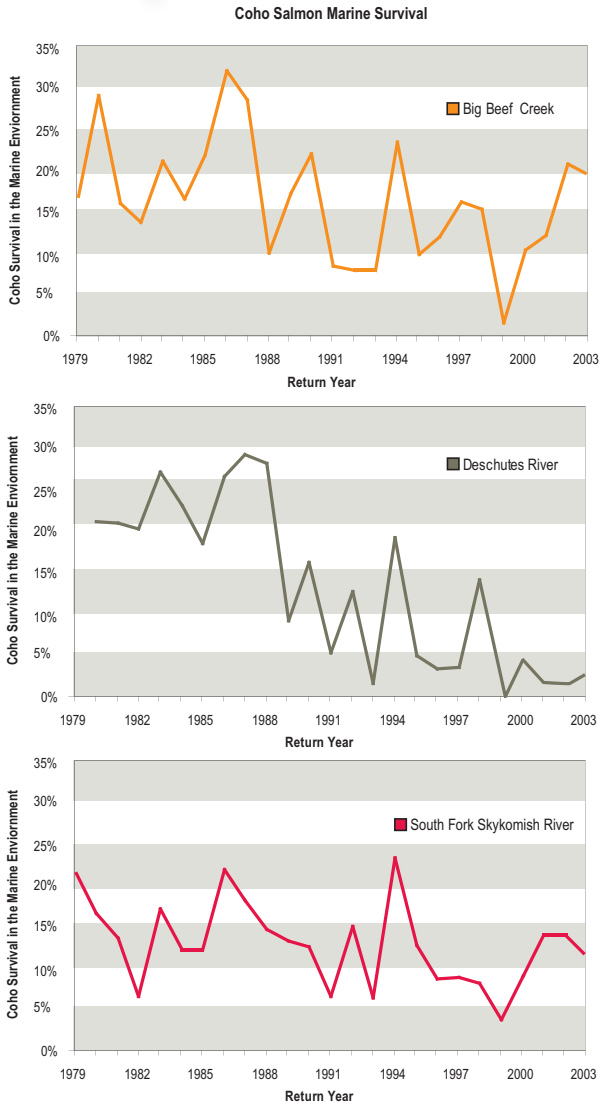
Salmon harvest in recent years is far below historic levels. In 1908, fishing crews landed a record catch of 690,000 chinook from Puget Sound.[10] In recent years, chinook harvest has averaged 64,000 fish in Puget Sound commercial net and troll fisheries and fewer than 50,000 fish in recreational fisheries.[11]

Trend

The only trend data available is for marine survival of coho, which has been studied in three Puget Sound streams for two decades. This information is not available for coho from other streams or for other species of salmon in Puget Sound.

Survival of coho through the marine portion of their life cycle declined from around 20 percent in the late 1980s to less than 5 percent in 1999. Since that low point, marine survival rates have rebounded for coho returning to two of the three Puget Sound streams that have been monitored. The rate of marine survival for coho returning to the Deschutes River, however, remains at very low levels. The cause of the continued poor survival in coho returning to extreme southern Puget Sound is unknown.

Coho salmon / Jamie Glasgow, Washington Trout



Survival of coho depends on a number of factors in both freshwater and marine environments. Three of 24 coho stocks in Puget Sound have been studied for two decades to determine their marine survival rates. Source: WDFW

INDICATOR: Herring

Pacific herring, sand lance, and surf smelt are the most important forage fish in Puget Sound. Forage fish school in such large numbers that they are often measured in biomass or weight rather than numbers of fish. Forage fish form a huge link in the Puget Sound food web. They feast on the billions of zooplankton in Puget Sound and transfer this enormous energy up the food chain to larger animals. Forage fish are valuable indicators of Puget Sound's productivity because they are food for marine birds and predatory fish, such as salmon. Indirectly, they provide food for orcas and other animals that rely on salmon.

Status

Herring have been monitored in Puget Sound for several years. The 19 herring stocks in Puget Sound are identified by where they spawn. As shown in the table below, WDFW classifies most Puget Sound herring stocks as healthy or moderately healthy. Three stocks are classified in relatively poor condition: one is classified as depressed and two as critical. The status of one stock is unknown.

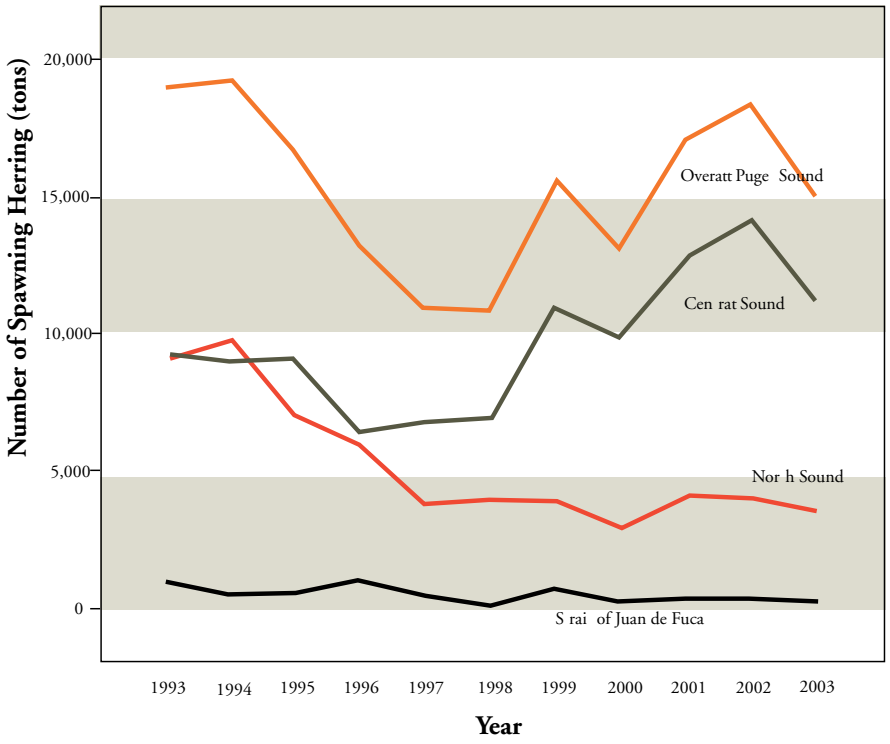
Trend

WDFW estimates that Puget Sound produced between 15,000 and 18,000 tons of herring in 2002 and 2003–an overall increase from lows of 10,000 to 11,000 tons in 1997 and 1998. The growth can be attributed to increases in stocks spawning in areas south and east of Admiralty Inlet.

Herring populations have declined in some spawning areas. Herring in the Strait of Juan de Fuca have shown a steady decline since the mid 1980s. Cherry Point herring, once the largest stock in Washington State, have shown steep declines during the past few decades. The stock dropped from 10,000 tons in 1994 to a low of 808 tons in 2000, a decline of 92 percent. The Cherry Point population has increased slightly in recent years to 1,611 tons observed in 2003. This is an improvement, but much lower than the minimum spawning goal of 3,200 tons that WDFW sets for this stock.

Changes in stock status shown in the Herring Stock table indicate trends for five stocks. Two stocks from Quartermaster Harbor and Port Gamble declined from healthy to moderately healthy. Three stocks from the San Juan Islands, Semiahmoo Bay, and Holmes Harbor improved from depressed to moderately healthy or healthy levels of abundance.

Abundance of Spawning Herring in Puget Sound 1993-2003



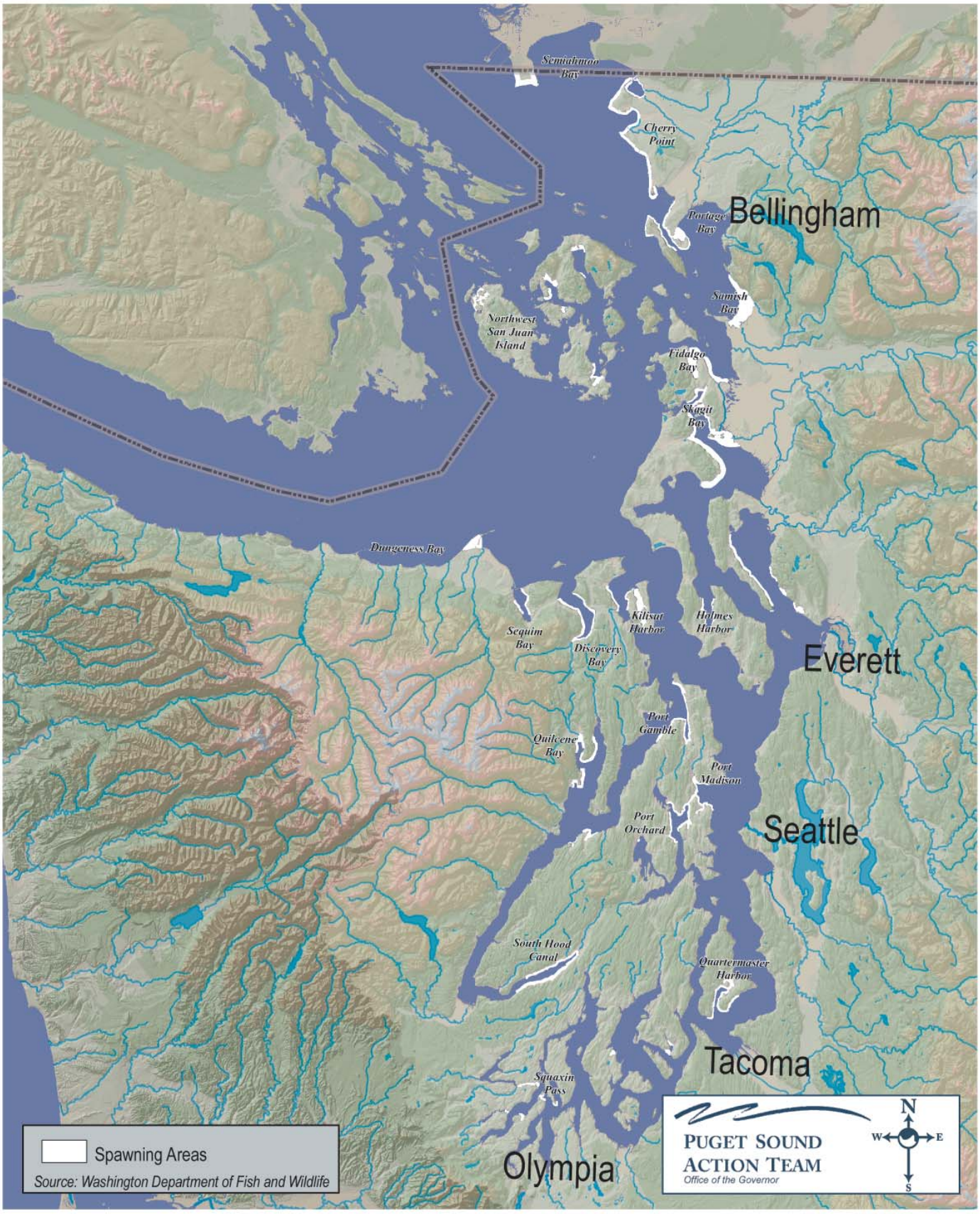
Cherry Point herring, once the largest stock in Washington, declined by 92% between 1994 and 2000. The stock is increasing, but is still far below its historical population.

Herring Stocks

Herring Stocks	2000	2002*
Healthy	10 stocks	8 stocks
Moderately Healthy	2 stocks	7 stocks
Depressed	3 stocks	1 stocks
Critical	2 stocks	2 stocks
Unknown	1 stock	1 stock

**WDFW surveyed 19 spawning grounds in 2002 compared to 18 in 2000. The spawning ground at Wollochet Bay was not surveyed prior to 2002. Source WDFW*

Herring Spawning Areas



INDICATOR: Marine Birds

The fall and winter are the best times to view marine birds in Puget Sound when thousands of migratory ducks, geese, diving birds, and shorebirds descend from the north and the interior. They rely on Puget Sound's productive waters, mudflats, and salt marshes to refuel and rest before returning to their nesting grounds in the spring.

Puget Sound provides food, breeding, nesting, and rearing habitat for more than 100 types of marine birds in the Sound either year-round or seasonally. A number of marine birds have declined in Puget Sound during the last few decades. In particular, Western grebes and surf scoters have shown significant declines since the 1970s.

Surf Scoters

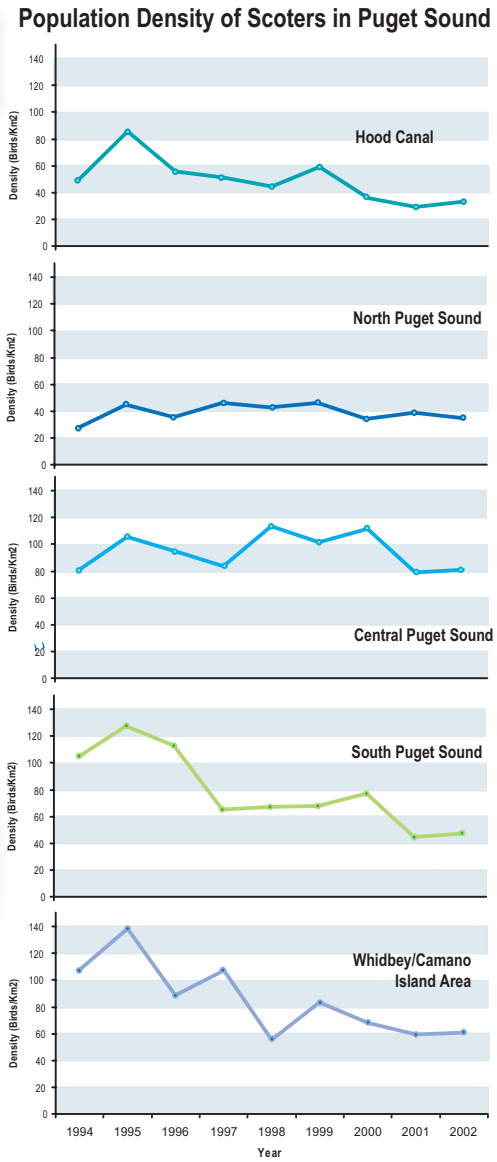
Surf scoters are diving ducks that breed in Canada and Alaska and winter in Puget Sound. Scoters prey on mollusks, crustaceans, and herring eggs, which may give them the nutritional boost they need to migrate to areas where they molt and spend the summer. Declining populations of one of the most common sea ducks found in Puget Sound is disturbing.

Status

WDFW is concerned with the relatively low numbers of scoters wintering in Puget Sound and has initiated efforts to investigate the status and cause for declining numbers of these birds.

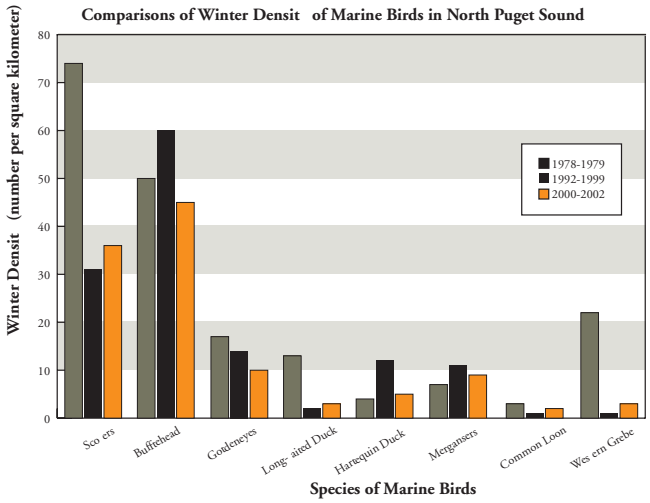
Trend

Scoters have decreased throughout the region during the past nine years. South Sound populations have declined by 69 percent since 1995. In some areas of northern Puget Sound and Hood Canal, populations have declined by 57 percent since the mid-1990s. Populations in central Puget Sound and certain areas of northern Puget Sound are more stable.



Western Grebes

Grebes are fish-eating birds that breed inland near wetland areas. They winter in large flocks on the coast or Puget Sound. WDFW placed western grebes on its species of concern list because of sharply declining numbers.



Status

While all four grebe species that winter in Puget Sound have declined during the last 20 years, western grebe populations have shown striking declines of about 95 percent.

Trend

Southern Puget Sound, Hood Canal, and portions of northern Puget Sound have shown the greatest decline in western grebe populations during the last nine years. Western grebe populations in central Puget Sound near Bainbridge Island have stabilized in recent years.

INDICATOR: Orcas

Center for Whale Research

People never forget the first time they see a wild orca. To many people, no species captures the essence of Puget Sound better than orcas, also known as killer whales. Their image is recreated in Salish tribal art, plush toys, and in the pages of tourist brochures.

Four populations of orcas swim through the region, but only one group of about 85 whales, referred to as the southern resident orcas, consistently return to spend a portion of each year in Puget Sound and the Strait of Georgia. They serve as indicators of the health of the marine ecosystem because they are long-lived predators and they depend on prey in Puget Sound for several months.

Orcas tend to accumulate dangerously high levels of PCBs, DDT, and other pollutants in their bodies, which can affect their ability to reproduce and fight disease.

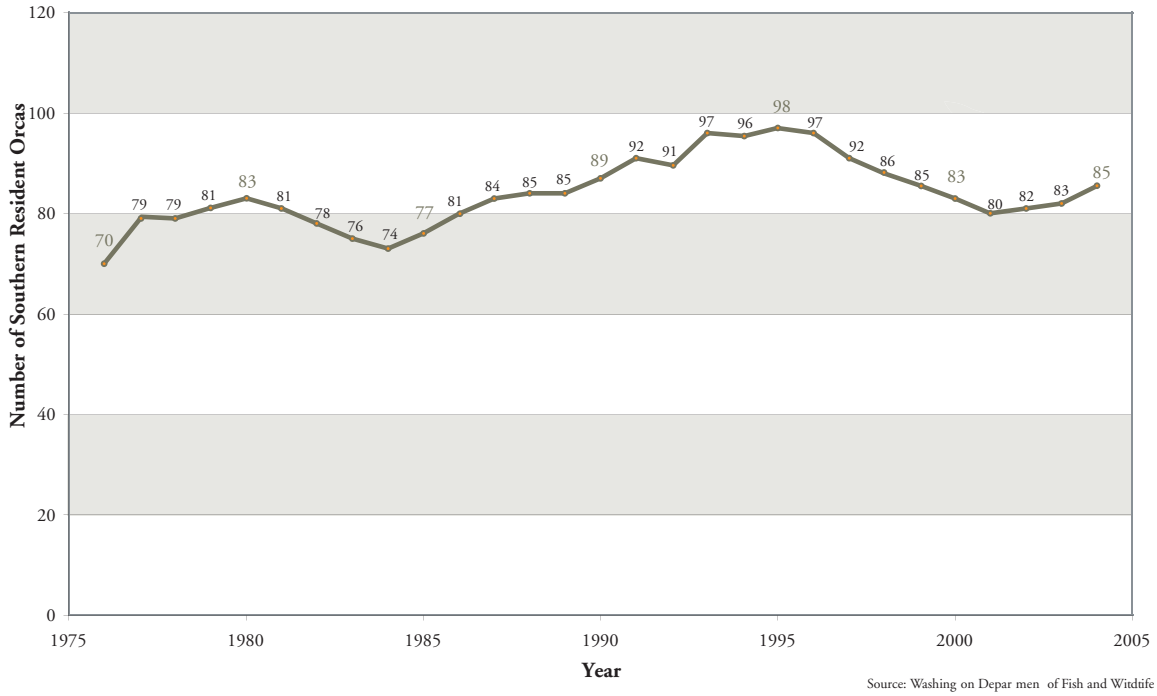
Status

The population of southern resident orcas has grown during the past several years. In 2003, researchers identified 83 whales in the population. In 2004, three births and one death increased the population to 85. One whale separated from the group is not included in the count.

Trend

Little information exists prior to the first orca census conducted in 1974. Researchers estimate that the size of the pre-1850s southern resident orca populations may have been about 200 whales. Models suggest that the population in the mid-1960s was about 95 whales. Only about 70 whales remained in the mid-1970s. Populations have increased from that low point with alternating periods of growth and decline. A steep decline from 98 to 80 whales occurred from 1995 to 2001, but the population of the southern resident orcas has gradually increased since then.

Number of Southern Resident Orcas 1976-2004



Source: Washing on Depar men of Fish and Witdife